

BUREAU OF WATER

South Carolina Department of Health and Environmental Control

SHELLFISH MANAGEMENT AREA 09A

2003 ANNUAL UPDATE

Shellfish Sanitation Program

Water Monitoring, Assessment and Protection Division
Environmental Quality Control - Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201

July 2003



WEB ADDRESS:
<http://www.scdhec.net/water/html/shellfish.html#reports>

2003 ANNUAL UPDATE

[Data Thru December 2002]

Shellfish Management Area 09A Shellfish Sanitation Program



Preparers: Benjamin S. Whaley, Environmental Health Manager
Harry M. Seel, Jr., District Program Manager
Trident Environmental Quality Control District
1362 McMillan Avenue, Suite 300
Charleston, South Carolina 29405

Reviewers/Editors:
David G. Baize, Division Director
(and) Charles Newell, Shellfish Program Manager
Water Monitoring, Assessment, and Protection Division
Environmental Quality Control - Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201

David G. Baize, Division Director
Water Monitoring, Assessment, and Protection Division
Environmental Quality Control - Bureau of Water

TABLE OF CONTENTS

Shellfish Management Area 09A Annual Update

Summary	2
Introduction	2
Pollution Source Survey	6
Changes In Pollution Sources	6
Survey Procedures	6
Point Source Pollution.....	6
A. Municipal and Community Waste Treatment Facilities	7
B. Industrial Waste	7
C. Marinas	8
D. Radionuclides	8
Nonpoint Source Pollution	8
A. Urban and Suburban Stormwater Runoff	8
B. Agricultural Runoff.....	9
C. Individual Sewage Treatment and Disposal Systems	9
D. Wildlife and Domestic Animals	9
E. Boat Traffic	9
F. Hydrographic and Habitat Modification	9
G. Marine Biotoxins	9
Hydrographic and Meteorological Characteristics	9
Water Quality Studies	10
Conclusions	12
Recommendations	12
References	14
Conditional Area Management Plan	22
Evaluation of Management Plan	
Pollution Event Closure	
Special Data Sets	

Figures and Tables

Figures:

(1) Shellfish Harvesting Classification Prior to this Survey	16
(2) Current Shellfish Harvesting Classification <i>(Shellfish Sampling Stations Included)</i>	17
(3) Potential Pollution Sources.....	18

Tables:

(1) Shellfish Water Quality Sampling Stations Description	15
(2) Fecal Coliform Bacteriological Data Summary Sheet <i>(January 01, 2000 - December 31, 2002)</i>	19
(3) Water Quality Sampling Station Data	20
(4) Rainfall Data <i>(January 01, 2000 - December 31, 2002)</i>	21

2003 ANNUAL UPDATE
Shellfish Management Area 09A
SCDHEC EQC Bureau of Water

Data Inclusive Dates:

01 / 01 / 00 thru 12 / 31 / 02

Classification Change:

 X Yes No

Shoreline Survey Completed: Yes

(I)ncreased/(D)ecreased/(N)one:

 N Approved

 D Cond. Approved

 I Restricted

 N Prohibited

Prior Report & Date: Annual -2002

SUMMARY

Shellfish growing area water quality in Area 09A continues to fluctuate. Annual water quality oscillations, primarily rainfall-induced, frequently result in shifts between Approved and Restricted classification at several Area 09 monitoring stations. For the current thirty-six month review period, twenty-two of the thirty-three active shellfish monitoring stations exhibited slight elevations (from 2002 Annual Report review period data) in fecal coliform geometric means and/or estimated 90th percentile MPN values, while nine of the remaining ten stations exhibited slightly lower levels; one sample is new and could not be compared with the previous review period. Twenty of the thirty-three stations, however, met statistical criteria for an Approved classification as compared to twenty-two stations in the 2001 report. Nearly all of the upland shoreline has waterfront residential property directly along the marsh. Development in close proximity to shellfish harvesting waters is a likely contributor to lower water quality within the area.

Analytical data review suggests that the existing Conditionally Approved area should be modified. Data indicates several stations located within the Conditionally Approved area did not meet the proper classification criteria. These stations will be reclassified appropriately. The criteria set forth in the management plan appears to be adequately addressing human health concerns regarding fecal coliform bacteria.

INTRODUCTION

PURPOSE AND SCOPE

The authority to regulate the harvest, sanitation, processing and handling of shellfish is granted to the South Carolina Department of Health and Environmental Control by Section 44-1-140 of the Code of Laws of South Carolina, 1976, as amended. The Department promulgated Regulation 61-47, which provides the rules used to implement this authority and outlines the requirements applied in regulating shellfish sanitation in the State. This regulation specifically addresses classification of shellfish harvesting

areas and requires that all areas be examined by sanitary and bacteriological surveys and classified into an appropriate shellfish harvesting classification.

The National Shellfish Sanitation Program (NSSP) Guide For The Control Of Molluscan Shellfish is used by the United States Food and Drug Administration (USFDA) to evaluate state shellfish sanitation programs. The NSSP Model Ordinance requires that a sanitary survey be in place for each growing area prior to its use as a source of shellfish for human consumption and prior to the area's classification as Approved, Conditionally Approved, Restricted, or Conditionally Restricted. Each sanitary survey shall be updated on an annual basis and accurately reflect changes which have occurred within the area. Requirement of the annual reevaluation include, at a minimum, field observations of pollution sources, an analysis of water quality data consisting of the past year's data in combination with appropriate previously collected data, review of reports and effluent samples from pollution sources, and review of performance standards for discharges impacting the growing area. A brief report documenting the findings shall also be provided.

The following criteria consistent with the NSSP Model Ordinance and S. C. Regulation 61-47 are used in establishing shellfish harvesting classifications:

Approved - Growing areas shall be classified Approved when the sanitary survey concludes that fecal material, pathogenic microorganisms, and poisonous or deleterious substances are not present in concentrations which would render shellfish unsafe for human consumption. The Approved area classification shall be designated based upon a sanitary survey, which includes water samples collected from stations in the designated area adjacent to actual or potential sources of pollution. For waters sampled under adverse pollution conditions, the median fecal coliform Most Probable Number (MPN) or the geometric mean MPN shall not exceed fourteen per one hundred milliliters, and not more than ten percent of the samples shall exceed a fecal coliform MPN of forty-three per one hundred milliliters (per five tube decimal dilution). For waters sampled under a systematic random sampling plan, the geometric mean fecal coliform Most Probable Number (MPN) shall not exceed fourteen per one hundred milliliters, and the estimated ninetieth percentile shall not exceed an MPN of forty three (per five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP Guidelines.

Conditionally Approved - Growing areas may be classified Conditionally Approved when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be adopted by the Department prior to classifying an area as Conditionally Approved. Where appropriate, the management plan for each Conditionally Approved area shall include performance standards for sources of controllable pollution, e.g., wastewater treatment and collection systems, evaluation of each source of pollution, and means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate.

Restricted - Growing areas shall be classified Restricted when sanitary survey data show a limited degree of pollution or the presence of deleterious or poisonous substances to a degree which may cause the water quality to fluctuate unpredictably or at such a frequency that a Conditionally Approved classification is not feasible. Shellfish may be harvested from areas classified as Restricted only for the purposes of relaying or depuration and only by special permit issued by the Department and under Department supervision. For Restricted areas to be utilized as a source of shellstock for depuration, or as source water for depuration, the fecal coliform geometric mean MPN of restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Conditionally Restricted - Growing areas may be classified Conditionally Restricted when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be prepared by the Department prior to classifying an area as Conditionally Restricted. Where appropriate, the management plan for each Conditionally Restricted area shall include performance standards for sources of controllable pollution (e.g., wastewater treatment and collection systems and an evaluation of each source of pollution) and description of the means of rapidly closing and subsequent reopening of areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate. Shellfish may be harvested from areas classified as Conditionally Restricted only for the purposes of relaying or depuration and only by permit issued by the Department and under Department supervision. For Conditionally Restricted areas to be utilized as a source of shellstock for depuration, the fecal coliform geometric mean MPN of Conditionally Restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Prohibited - Growing areas are classified Prohibited if there is no current sanitary survey or if the sanitary survey or monitoring data show unsafe levels of fecal material, pathogenic microorganisms, or poisonous or deleterious substances in the growing area or indicate that such substances could potentially reach quantities which could render shellfish unfit or unsafe for human consumption.

BACKGROUND INFORMATION

This sanitary survey evaluates the current harvesting classification of shellfish growing waters designated as Shellfish Management Area 09A (Area 09A). Area 09A consists of approximately 7,044 acres of shellfish growing area habitat located in Charleston County, South Carolina. The area consists of the Atlantic Intracoastal Waterway (AIWW) and four primary creeks: Conch, Hamlin, Inlet and Swinton. Area 09A extends from approximately one quarter mile south of Morgan Creek to the Charleston Harbor. The northern boundary is an imaginary line extending from 41st Avenue on the Isle of Palms, through Gray Bay, to the Mount Pleasant mainland near Six Mile Road. US Highway 17 defines the area's western boundary. The southern boundary is the Charleston Harbor. The eastern boundary consists of the Atlantic Ocean shoreline of the Isle of Palms and Sullivan's Island.

The harvesting classifications of Area 09A prior to this sanitary survey were as follows:

Prohibited: (administrative closure)

1. The AIWW, extending 1000 feet from the Forest Trail outfall;
2. Hamlin Creek, 1225 feet from the Isle of Palms Marina and the Long Island Yacht Harbor;
3. The Cove, along Sullivan's Island, between Charleston Harbor and the Ben Sawyer Bridge.

Restricted:

1. The AIWW, from the administrative closure at Station 18 southwest to Station 19;
2. The AIWW, from Station 36 southwest to Station 9;
3. Sullivan's Island Narrows from Station 34 east to Station 17A and all adjacent marshlands south;
4. Conch Creek, from Station 36 south to Station 17A;
5. Inlet Creek, from Station 24 south to Station 31.

Conditionally Approved:

1. Those waters of Swinton Creek and adjacent marshlands landward of Station 3;
2. Those waters of Inlet Creek and adjacent marshlands from Station 27 landward to Station 24 and from Station 31 to its headwaters;
3. Those waters of Conch Creek and adjacent marshlands landward of Station 17;
4. Those waters of Hamlin Creek and adjacent marshlands from Breach Inlet to Grey Bay at Station 2;
5. Those waters of the AIWW and adjacent marshlands from Station 1 to Station 19;
6. Those waters of Conch Creek and adjacent marshland from Station 17A eastward to Station 37;
7. Lofton Creek, from its confluence with Conch Creek to its headwaters.

Approved: All other waters in Area 09A.

The shellfish industry in South Carolina is based primarily on the harvest of the eastern oyster (*Crassostrea virginica*) and hard clams, which include both the northern clam (*Mercenaria*

mercenaria) and several small populations of the southern clam (*Mercenaria campechiensis*). Areas in South Carolina designated for commercial harvest by the South Carolina Department of Natural Resources (SCDNR) include State shellfish grounds, culture permits, and Kings Grant areas. The ribbed mussel, *Geukensia demissa*, is also harvested on a small scale in South Carolina by recreational harvesters.

There are two State shellfish grounds (S) within Area 09A. The northern portion of S-251 and all of S-255 are within the conditionally approved waters of the area. There are two Recreational shellfish grounds (R) located in Area 09A. R-234 encompasses Gray Bay, while R-252 consists of upper Hamlin Creek and its adjacent marshland. There is one King's Grant area located between Conch and Inlet Creeks bisected by the AIWW. There are numerous culture permit leases throughout the area located in both Approved and Conditionally Approved waters.

The shellfish harvest season in South Carolina normally extends from mid-September through mid-May. The South Carolina Department of Natural Resources (SCDNR) has the authority to alter the shellfish harvest season for resource management purposes and grant permits for year-round mariculture operations. Additionally, the South Carolina Department of Health and Environmental Control has the authority to prohibit shellfish harvesting when necessary to ensure that shellfish harvested in South Carolina waters are safe for human consumption.

POLLUTION SOURCE SURVEY

CHANGES IN POLLUTION SOURCES

No substantial changes in pollution sources have occurred in Area 09A since the 2002 report.

SURVEY PROCEDURES

Shoreline surveys of Area 09A were conducted by the Trident District Shellfish Sanitation staff, by watercraft, vehicle and on foot during the survey period and are ongoing. Extensive visual examinations of lands adjacent to the waters of Area 09A were conducted to determine potential sources of pollution entering shellfish growing waters.

POINT SOURCE POLLUTION

National Pollutant Discharge Elimination System (NPDES) Permitted Facilities		
Permit Number	Facility Name	Facility Type
SC0020052	Sullivan's Island WWTF	Municipal-Discharge
SC0040771	Mt. Pleasant Waterworks WWTF	Municipal-Discharge

SC0043583	Isle of Palms WTF R/O	Municipal-Discharge
SC0043869	Mt. Pleasant WW/WTR TTMT	Municipal-Discharge
SCG730074	D&A Partnership/Shell Point	Industrial-Discharge

A. Municipal and Community Waste Treatment Facilities – The Mount Pleasant

Waterworks operates two facilities within Area 9A, one located on Rifle Range Road and the other located on Center Street. Neither of these facilities discharge to Area 9A waters. The Sullivan's Island Wastewater Treatment Plant discharges near Cove Creek, adjacent to Ben Sawyer Boulevard. The Forest Trail Wastewater Treatment Plant is located within Area 08 on the Isle of Palms. The facility discharges treated effluent into the AIWW adjacent to 41st Avenue near the northern boundary of Area 9A. A minimum 1000-foot closure is located around all wastewater outfalls. Additionally, the Isle of Palms and the Mount Pleasant Waterworks both operate water treatment plants within the area. Both facilities ultimately discharge into Area 09A, however, there is no fecal coliform component associated with the effluents. Refer to the Potential Pollution Sources map included in this report.

There were no reported wastewater overflows that entered the growing waters of Area 9A in 2002. In May 2001, Mount Pleasant Waterworks reported a manhole failure on William St. Extension. The 17,233 gallons entered the marsh beside the Old Pitt Street Bridge, which is located in the Sullivan's Island cove. This area is administratively Prohibited.

In April 2000, Mount Pleasant Waterworks reported a manhole failure in a subdivision along the marsh, immediately north of the Isle of Palms Connector (Hwy 517). The 800 gallons reportedly entered a retention pond in the subdivision. Any overland runoff from this area would enter Hamlin Sound in the northern portion of Area 09A, however, no overland runoff was associated with this spill. In August 2000, Sullivan's Island WWTP reported a discharge violation. Their current permit limits their discharge to the 14/43 MPN standard. Sullivan's Island reported that the 90th percentile was 98 MPN. The Forest Trail Wastewater Treatment Plant exceeded their permit levels on two occasions in 2000. Permit limits established for fecal coliform for this facility are 14/43 MPN per 100 ml. According to Discharge Monitoring Reports (DMRs) submitted to the Department, the facility violated the permit limits in August and September of 2000.

Available hydrographic information suggests a possible impact from sources located outside the growing area. The portion of the area from the Charleston Harbor extending northeast to the Ben Sawyer Bridge appear to be impacted during certain hydrographic conditions by waters originating in the Charleston Harbor (Cleveland, 1967). Effluent from wastewater treatment plants discharging into the harbor may be impacting extreme southwestern portions of Area 09A. Flow calculations have established time and distance of travel and place the effluent plumes within the Cove at Sullivan's Island. Due to public health concerns, southwestern portions of Area 9A from Ben Sawyer Boulevard to the Charleston Harbor will remain administratively Prohibited.

- B. Industrial Waste (Discharges)** - Currently there are no operational industrial wastewater discharges located within the boundaries of Area 09A. The permit issued to D & A Partnership is for a small-scale mining operation. The facility has completed reclamation of their site and requested that their permit be canceled.
- C. Marinas** – S.C. Regulation 61-47, Shellfish defines *Marina* as “any water area with a structure (docks, basin, floating docks, etc.) which is: 1) used for docking or otherwise mooring vessels; and, 2) constructed to provide temporary or permanent docking space for more than ten boats, or has more than 200 linear feet of docking space.” There are three recreational facilities located within this management area. Two of facilities, Isle of Palms Marina and Long Island Yacht Harbor, are located adjacent to Breach Inlet. Combined, these two marinas typically accommodate approximately 55 boats. Sewage pump-out facilities are provided at the Long Island Yacht Harbor. Additionally, Toler’s Cove is located west of the AIWW, adjacent to the south side of the Ben Sawyer Boulevard. This marina accommodates approximately 40 boats and provides wastewater pump-out to the municipal sewer system. There are no commercial docking facilities meeting the definition of a marina within Area 09A.
- D. Radionuclides** - Sources of radionuclides have not been identified within Area 09A, and radionuclide monitoring has not been conducted. No other sources of poisonous or deleterious substances have been identified within the area.

NONPOINT SOURCE POLLUTION

- A. Urban and Suburban Stormwater Runoff** - The shoreline survey conducted in Area 09A revealed a high concentration of homes throughout most uplands adjacent to the shellfish growing area. Single-family homes continue to be built along the mainland shores. New homes are currently under construction on Goat Island (adjacent to station 18), in lower Hamlin Creek (adjacent to station 11) and in Toler’s Cove. Additionally, a new housing complex is under construction near Station 25. The bridge over Breach Inlet is being replaced. Stormwater runoff may adversely impact shellfish water quality by transporting fecal coliform bacteria from land to the shellfish growing area.

There are approximately 15 stormwater permits that have been issued within Area 09A. . These permits are included as an indicator of land disturbing activities. The permits are distributed throughout the area and have been primarily issued to construction sites and/or housing subdivisions. The remaining permits are for stormwater control for schools, churches and commercial properties. These areas are depicted on the attached Potential Pollution Source map. There are three dredge spoil areas located along the AIWW between Hamlin Creek and Inlet Creek. The Army Corps of Engineers conducted one dredge project in 2002. Toler’s Cove was dredged and the sediment was deposited on a dredge spoil area located at the confluence of Conch Creek and the AIWW.

The uplands surrounding the shellfish growing waters of Area 09A consist of various soil textures. These have been defined by the United States Department of Agriculture (USDA), Soil Conservation Service (1971) utilizing general classifications and descriptions. Although lands within Area 09A consist of numerous soil types, the area is generally comprised of Rutlege-Scranton-Pamlico soils, made up of low, broad flats and long, nearly level, sandy ridges. The area is interlaced with the Chipley series; which is a loamy, fine sand. The USDA (1971) further describes these soils as "somewhat poorly drained to very poorly drained, nearly level to depressional, sandy and mucky soils."

- B. Agricultural Runoff** - There are no permitted agricultural facilities located in Area 09A. The lack of concentrated agricultural activity near the shoreline of the growing waters precludes contamination of shellfish waters from agricultural runoff.
- C. Individual Sewage Treatment and Disposal Systems** - Homes adjacent to shellfish growing waters on Isle of Palms and Sullivan's Island are all served by sanitary sewer. Goat Island, located between Isle of Palms and Gray Bay, is served solely by individual septic systems. Cassina Plantation has approximately 33 homes on individual septic systems. This area is near stations 24, 30 and 31 in upper Inlet Creek. Mount Pleasant also has no sewer service from Ravens Run, north to the area border, along Rifle Range Road. Each system requires inspection and approval by the Division of Environmental Health, Trident Health District, prior to operation.
- D. Wildlife and Domestic Animals** - Area 09A supports a large population of domestic animals attributable to the number of private residences along the shores of Mount Pleasant, Isle of Palms and Sullivan's Island. The area also supports substantial wildlife populations, primarily various types of marine waterfowl typical of coastal South Carolina. The waterfowl are present all year in the area. However, they have been noted to be in higher concentrations during the summer months (June-August).
- E. Boat Traffic** - Recreational boat traffic is heavy in the area throughout the year. Commercial traffic in the AIWW is moderate and consists primarily of tugs and barges. Commercial fisheries boats, primarily shrimpers and crabbers ranging in size from 16 to 50 feet, operate in accordance with seasonal fisheries. During the recreational shrimp-baiting season, typically extending from mid-September through mid-November, recreational traffic is very heavy.
- F. Hydrographic and Habitat Modification** - Hydrographic and habitat modification in estuarine areas requires both State and Federal approval. Portions of the AIWW require maintenance dredging. The U.S. Army Corps of Engineers utilizes designated tracts of land adjacent to the AIWW as dredge spoil sites.
- G. Marine Biotoxins** - Bivalve shellfish contamination from marine biotoxins has not been shown to be a human health concern within Area 09A. The Department participates in a State Task Force on Toxic Algae and maintains a toxic algae emergency response team.

HYDROGRAPHIC AND METEOROLOGICAL CHARACTERISTICS

PHYSIOGRAPHY

Area 09A is comprised of tidal creeks, shallow bays and associated tidal marshlands. The creeks within the area range from 20 to 300 feet in width. Maximum depths approach approximately 20 feet. Additionally, the AIWW traverses the area's entire length in a northeasterly-southwesterly direction. The AIWW is maintained at a mean low water depth of 12 feet by the US Army Corps of Engineers. The major conduits of water flowing into and out of the area are; the AIWW on the northeastern border, Breach Inlet, between Sullivans Island and the Isle of Palms which define the eastern extent of the area, and, during low river flow conditions, the Charleston Harbor on the southwestern border. The influence of high-salinity ocean water, entering the area via these inlets, provides high flow and a subsequent flushing action that assists in moderating the affects of rainfall runoff water quality. The entire area is approximately four miles wide (northwest to southeast) and seven miles long (southwest to northeast).

Tides - Tides in Area 09A are semidiurnal, consisting of two low and two high tides occurring each lunar day. Mean tidal ranges in Hamlin Creek along the Isle of Palms are 5.1 feet during normal tides and 6.7 feet during spring tides. Wind direction and intensity, as well as atmospheric pressure, typically cause variations in predicted tidal ranges.

Rainfall - Precipitation in Area 09A is heaviest during late summer and early autumn. Tropical storms and hurricanes occasionally produce extremely large amounts of rainfall. During winter months heavy rainfall events are uncommon, yet occasional intense thunderstorms associated with rapidly moving low-pressure systems generate heavy rains. Precipitation rarely occurs in the form of snow or ice. Spring weather patterns may be dynamic with associated thunderstorms and severe weather conditions.

The yearly rainfall average for a thirty-year period in Charleston, recorded at the Charleston Airport, is 50.74 inches. The 2002 precipitation total recorded in Mount Pleasant was 76.9 inches. Four months, July through October, accounted for 35.0 inches of rain. This represents 46% of the yearly total rainfall.

Winds - Prevailing winds along the central portion of the South Carolina coast are from the south and west during spring and summer and from the north during autumn and winter. Wind speeds are generally less than 15 miles per hour (mph); however, strong weather systems may generate winds in excess of 25 mph. Tropical storms and hurricanes occur occasionally.

RIVER DISCHARGES

Freshwater rivers do not discharge directly into Area 09A. Freshwater influence is primarily due to rainfall, although, during periods of high flow in the Cooper River, brackish water may enter via Charleston Harbor.

WATER QUALITY STUDIES

DESCRIPTION OF THE PROGRAM

The Department currently utilizes a systematic random sampling (SRS) strategy within Area 09A in lieu of sampling under adverse pollution conditions. In order to comply with NSSP guidelines, a minimum of thirty samples are required to be collected and analyzed from each station during the review period. Sampling dates are computer generated prior to the beginning of each quarterly period thereby insuring random selection with respect to tidal stage and weather. Day of week selection criteria is limited to Mondays, Tuesdays and Wednesdays due to shipping requirements and laboratory manpower constraints. Sample schedules are rarely altered.

During July 1998, an updated shellfish water quality data scheduling and collection procedure was formalized. Samples utilized for classification purposes are limited to those samples collected in accordance with the SRS for a 36-month period beginning January 1 and ending December 31. This allows for a maximum of 36 samples per station, yet provides a six-sample “cushion” (above the NSSP required 30 minimum) for broken sample bottles, lab error, breakdowns, etc. This also allows each annual report’s water quality data to meet the requirements for the NSSP Triennial Review sampling criteria.

One thousand one hundred and sixty-four SRS surface water quality samples (<1.0 ft. deep) were collected for bacteriological analyses and classification purposes from thirty-three active water quality sampling stations in Area 09A during the period 01/01/00 through 12/31/02. The samples utilized for this report were collected in 120 ml amber glass bottles, immediately placed on ice and transported to the South Carolina Department of Health and Environmental Control's Trident District Environmental Quality Control laboratory at North Charleston, South Carolina. An additional 120 ml water sample was included with each shipment as a temperature control. At the laboratory, sample sets exceeding a 30-hour holding time or containing a temperature control in excess of 10 degrees C. were discarded (APHA, 1970).

Surface water temperatures were measured utilizing hand-held, laboratory-quality calibrated centigrade thermometers. Salinity measurements were measured in the laboratory using an automatic temperature compensated refractometer. Additional field data include ambient air temperature, wind direction, tidal stage and date and time of sampling. Tidal stages were determined by using Nautical Software’s *Tides & Currents*, Version 2 (1996).

WATER QUALITY MONITORING RESULTS

No station exceeded a fecal coliform geometric mean MPN value of 14. Stations exceeding a fecal coliform MPN estimated 90th percentile value of 43 were 9, 17A, 18, 19, 20, 23, 24, 28, 29, 30, 31 and 34. No station exceeded an estimated 90th percentile fecal coliform MPN value of 260. Data from Station 5 shows a geometric mean MPN of 6.9 and an estimated 90th percentile value of 43; and

Station 28 indicates a geometric mean MPN of 8.2 and an estimated 90th percentile value of 51. Samples collected on October 14, 2002 contributed to elevated geometric mean and/or estimated 90th percentile values at these stations. The exclusion of data collected on October 14, 2002 may be justified due to the fact that Area 9A was under a Precautionary Closure from September 26, 2002 until October 25, 2002. With the October 14 data excluded, Station 5 has a geometric mean of 6.2 and a 90th percentile value of 33, and Station 28 has a geometric mean of 7.4 and a 90th percentile value of 41. Based on exclusion of this data, stations 5 and 28 will remain Approved.

CONCLUSIONS

Based on review of fecal coliform bacteriological data and the pollution source survey, Area 09A is impacted by one primary source of actual or potential pollution.

NONPOINT SOURCE RUNOFF

Stormwater runoff continues to be the major source of fecal coliform bacteria throughout the area. The moderate animal populations, both domestic and wild, probably contribute to the water quality in the area. For the 2003 review period, twenty-two of the thirty-three active shellfish monitoring stations exhibited slight elevations (from 2002 Annual Report review period data) in fecal coliform geometric means and/or estimated 90th percentile MPN values. The overland runoff problem in Area 09A appears to be mitigated by high salinity ocean water entering the estuary through Breach Inlet.

Further review of the analytical data suggests that the existing Conditionally Approved area should be modified. Data indicates that the geometric mean and the 90th percentile values for several stations located within the Conditionally Approved area fail to meet the proper classification criteria. These stations will be reclassified appropriately. The criteria set forth in the management plan appears to be adequately addressing human health concerns regarding fecal coliform bacteria.

RECOMMENDATIONS

The shoreline survey and bacteriological data review of shellfish growing Area 09A indicate that the current classifications should be modified. The Conditionally Approved area will be downgraded to a Restricted classification in lower Conch Creek at stations 17A and 20. Stations 11, 29 and 1 in Lower Hamlin Creek will also be reclassified as Restricted. Additionally, stations 24 and 31, in the upper reaches of Inlet Creek, will no longer be managed as Conditionally Approved boundary stations. This action is due to increased geometric mean and 90th percentile values which have resulted in the failure of these stations to comply with the Area 9A Conditionally Approved Management Plan management criteria. The harvesting classifications of Area 09A for this sanitary survey will remain as follows:

Prohibited: (Administrative closure)

1. The AIWW, extending 1000 feet from the Forest Trail outfall;

2. Hamlin Creek and Breach Inlet, 1,225 feet around the Isle of Palms Marina and the Long Island Yacht Harbor;
3. The Cove, along Sullivan's Island, between Charleston Harbor and the Ben Sawyer Bridge.

Restricted:

1. The AIWW, from the administrative closure at Station 18 southwest to Station 19;
2. The waters of lower Hamlin Creek from Station 11 to its confluence with the AIWW at Station 1;
3. The AIWW, from Station 36 southwest to Station 9;
4. Sullivan's Island Narrows from Station 34 east to Station 17A and all adjacent marshlands south;
5. Conch Creek, from Station 36 south to the administrative closure at Breach Inlet;
6. The northern bank of Inlet Creek from Station 32 to Station 6;
7. The left fork of Inlet Creek from Station 6 to its headwaters;
8. The western bank of the first creek on the right, downstream of Station 6 (unnamed creek) from its confluence with Inlet Creek (Station 32) to its headwaters; and then along an imaginary line northwest to the Mt. Pleasant shoreline;
9. Lofton Creek, from its confluence with Conch Creek to its headwaters.

Conditionally Approved:

1. Those waters of Swinton Creek and adjacent marshlands landward of Station 3;
2. Those waters of Inlet Creek and adjacent marshland from station 27 landward to Station 32;
3. Those waters along the southern shore of Inlet Creek from Station 32 to Station 6;
4. Those waters of the right fork of Inlet Creek and adjacent marshland landward from Station 6 to its headwaters;
5. Those waters of Conch Creek and adjacent marshlands landward of Station 17;
6. Those waters of Hamlin Creek and adjacent marshlands from Station 26 to Grey Bay at Station 2;

Approved: All other waters in Area 09A.

Station Additions/Deactivations/Modifications: None

Analysis of sampling data for Area 09A demonstrates the probability of a significant impact from rainfall exceeding 4.00" in a 24 hour period. Therefore, a precautionary closure of Area 09A will be implemented following rainfall events of greater than 4.00" in a 24 hour period, as measured at the Mount Pleasant Waterworks, Rifle Range Road facility located in Mount Pleasant. This methodology is associated with the concept of the Probable Maximum Precipitation (PMP). PMP estimates for the coastal United States have been published in a series of hydro-meteorological reports (HMRs) by the National Weather Service (*National Weather Service*). PMP estimates for South Carolina's growing areas are derived from HMRs 51, 52, and 53 (*National Research Council, 1985*).

REFERENCES

- American Public Health Association, Inc. *Procedures for the bacteriologic examination of sea water and shellfish*, 1970. p. 28-47. In *Recommended procedures for the examination of sea water and shellfish*, 4th ed. Library of Congress, Washington, D.C.
- Cleveland, E. G., 1967. *Sullivans Island - Isle of Palms hydrographic study*. United States Department of Health, Education and Welfare, Public Health Service, Region IV, Atlanta GA.
- National Research Council, 1985, *Safety of Dams - Flood and Earthquake Criteria* National Academy Press, Washington DC.
- National Shellfish Sanitation Program (NSSP) -- *Guide for the Control of Molluscan Shellfish*, 1997 Revision. U.S. Department of Health and Human Services, Washington, D.C.
- National Weather Service. The National Oceanic and Atmospheric Administration. *Precipitation Frequency Atlas of the Western US: NOAA Atlas II*. Superintendent of Documents, US Government Printing Office - Washington DC.
- United States Department of Agriculture, Soil Conservation Service, 1971. *Soil survey of Charleston County, South Carolina*. In cooperation with South Carolina Agricultural Experiment Station and South Carolina Land Resources Conservation Commission, National Cooperative Soil Survey, Washington, D.C. p. 78.

TABLE #1
Shellfish Management Area 09A
Water Quality Sampling Stations Description

<u>Station</u>	<u>Description</u>
01	Hamlin Creek at its confluence with AIWW
02	Upper end of Hamlin Creek at POG
03	Upper end of Swinton Creek
05	Shortcut - Swinton Creek
06	Inlet Creek and Gentide Creek
07	Inlet Creek at its confluence with AIWW
09	Ben Sawyer Bridge
11	End of 10th Street at Hamlin Creek
12	Swinton Creek at its confluence with Hamlin Creek
14	Swinton Creek at its confluence with AIWW
15	AIWW between Inlet and Swinton Creeks
17	Conch Creek State Shellfish Ground - Mt. Pleasant side
17A	Conch Creek State Shellfish Ground - Sullivans Island side
18	AIWW adjacent to Wild Dunes Golf Course storm drainage outfall
19	AIWW at 25th Street - Isle of Palms
20	Conch Creek at Lofton Creek
21	Inlet Creek 100 yards past first bend
22	AIWW - Marker #118
23	Upper reaches of Conch Creek
24	Upper reaches of Inlet Creek
25	Upper reaches of Swinton Creek
26	Hamlin Creek ? way between Stations 1 and 2
27	Inlet Creek west of AIWW at first bend
28	Swinton Creek west of AIWW at second bend
29	Lower Hamlin Creek at site of new bridge (Isle of Palms Connector)
30	Upper Inlet Creek at Jennie Creek
31	Bay at end of upper Inlet Creek
32	First creek on right downstream from station 6
33	First large creek up Inlet Creek from station 8
34	AIWW at confluence with Sullivans Island Narrows (across from ECOMC dock)
35	300 yards upstream from station 6
36	Conch Creek at its confluence with AIWW
37	Lower Conch Creek at marina closure zone

(Total 33)

Figure 1.
Shellfish Management
Area 09A
Prior Classification

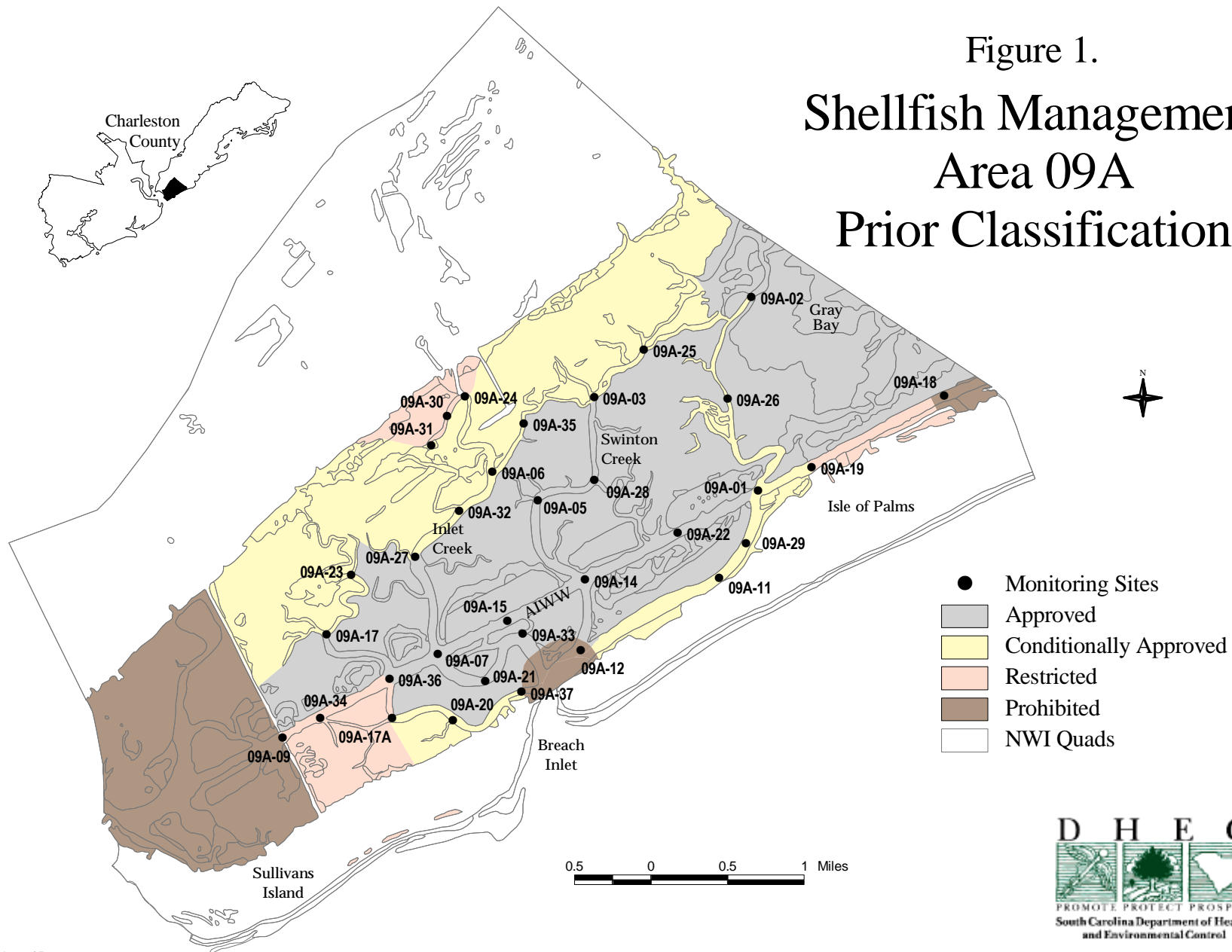


Figure 2.
Shellfish Management
Area 09A
Current Classification

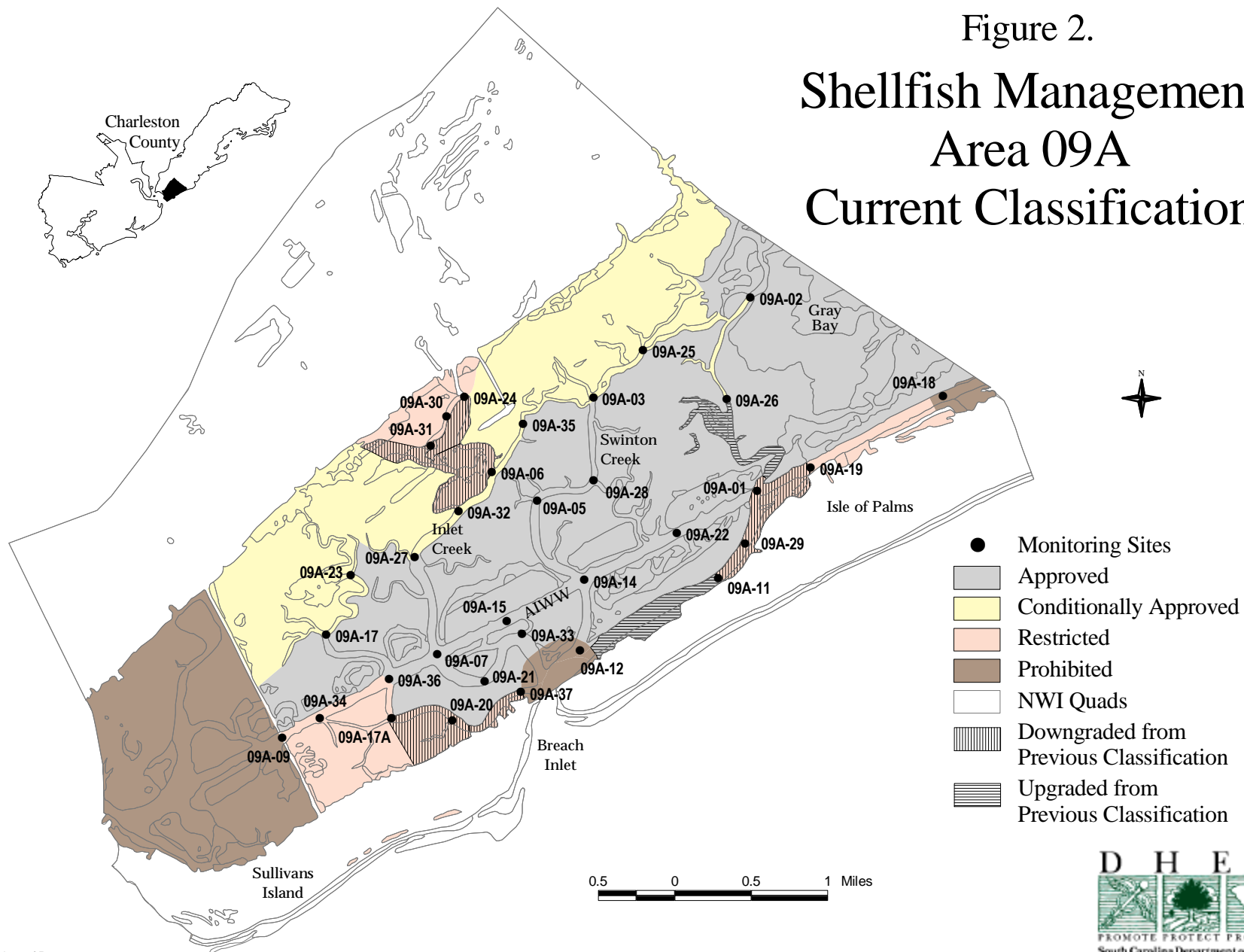


Figure 3.
Shellfish Management
Area 09A
Potential Pollution Sources

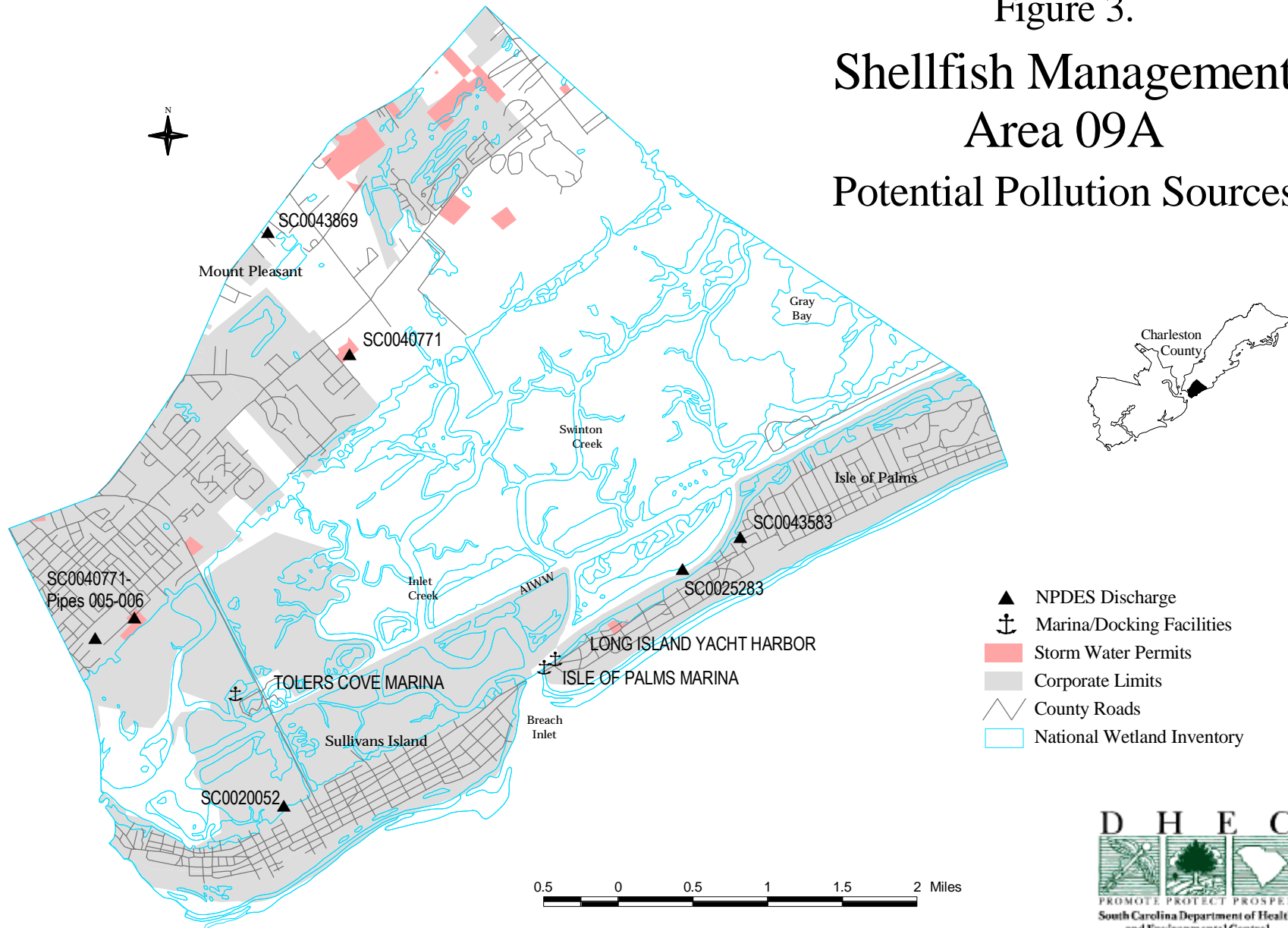


TABLE #2
Shellfish Management Area 09A
FECAL COLIFORM BACTERIOLOGICAL DATA SUMMARY
from Shellfish Water Quality Sampling Stations between
January 1, 2000 and December 31, 2002

Station #°	1	2	3	5	6	7	9	11	12	14
SAMPLES	36	36	36	36	36	36	36	36	36	36
GEOMEAN	6.1	3.4	5.6	6.9	6.6	5.1	11.1	7.4	5.3	5.1
90TH %ILE	26	10	25	43	41	21	59	38	18	25
WATER QLTY	A	A	A	A	A	A	R	A	A	A
CLASSIFICATION	R	CA	CA	A	CA	A	P	R	P	A

Station #°	15	17	17A	18	19	20	21	22	23	24
SAMPLES	36	36	36	36	36	36	36	36	36	36
GEOMEAN	4.5	7.6	8.2	10.1	7.9	10.4	4.1	5.4	8.0	9.6
90TH %ILE	13	31	52	104	44	73	14	27	49	88
WATER QLTY	A	A	R	R	R	R	A	A	R	R
CLASSIFICATION	A	CA	R	P	R	R	A	A	CA	R

Station #°	25	26	27	28	29	30	31	32	33	34
SAMPLES	36	36	36	36	36	36	36	36	36	36
GEOMEAN	6.5	6.7	5.9	8.2	8.1	10.6	10.8	6.5	4.6	13.4
90TH %ILE	32	36	28	51	50	79	90	36	13	67
WATER QLTY	A	A	A	R	R	R	R	A	A	R
CLASSIFICATION	CA	CA	CA	A	R	R	R	CA	A	R

Station #°	35	36	37							
SAMPLES	36	36	12							
GEOMEAN	5.7	7.5	6.8							
90TH %ILE	23	32	38							
WATER QLTY	A	A	NEW							
CLASSIFICATION	CA	R	NEW							

TABLE #3

<p>Water Quality Sampling Stations Data</p>
--

Shellfish Management Area 09A

BACTERIOLOGICAL DATA

Data for each shellfish station listed in this report's "Fecal Coliform Bacteriological Data Summary Table" and in other shellfish reports, can be obtained through South Carolina's Department of Health and Environmental Control - Freedom of Information office at the address below.

Freedom of Information
2600 Bull Street
Columbia, SC 29201

Any explanation or clarity needed on the report's content can be obtained by contacting the preparer(s), and/or reviewer(s) listed on the cover page.

TABLE #4

Rainfall Data

Shellfish Management Area 09A

SOURCE:

Rainfall information provided by
Mount Pleasant Waterworks & Sewer Commission
Mount Pleasant, South Carolina.
[Rifle Range Road rainfall recording station]

ANNUAL TABLE OF DAILY RAINFALL DATA
SOURCE: Mt. Pleasant Waterworks and Sewer Commission
Mt. Pleasant, SC (Rifle Range Road rainfall recording station)

2000	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1									1.00			
2								0.40	1.50			0.10
3			0.30						0.90			
4			0.40			0.50		0.80	1.20		0.10	
5									1.20			
6	0.10						0.20					
7	0.20						0.30		0.40			
8				0.30								
9												0.80
10	0.30											
11								3.30				
12							1.30					
13		0.70					1.10	0.50				
14		1.10		0.50			0.10					0.10
15												
16			0.70									
17				0.30					4.10			
18								1.30	0.10		0.40	
19	0.20		0.20								0.90	
20	0.30		1.50						0.10			
21									0.10			
22									0.50			
23	0.30						0.30	0.10				
24	1.00			0.30			1.10	0.30			0.30	
25							0.30				0.90	
26												
27			0.30					0.40				
28	0.20							0.30				1.00
29	0.50			0.20		1.20	1.90	0.50				
30	0.30		0.20				1.50					
31							0.20					

(Monthly Figures)

Year's Rainfall Total:

44.00

SUM	3.40	1.80	3.60	1.60	0.00	1.70	8.30	7.90	11.10	0.00	2.60	2.00
MAX	1.00	1.10	1.50	0.50	0.00	1.20	1.90	3.30	4.10	0.00	0.90	1.00
MIN	0.10	0.70	0.20	0.20	0.00	0.50	0.10	0.10	0.10	0.00	0.10	0.10
AVG	0.34	0.90	0.51	0.32	0.00	0.85	0.75	0.79	1.01	0.00	0.52	0.50

No entries indicate no rainfall.

(Rainfall Data covers Areas 8, 9A and 9B.)

ANNUAL TABLE OF DAILY RAINFALL DATA
SOURCE: Mt. Pleasant Waterworks and Sewer Commission
Mt. Pleasant, SC (Rifle Range Road rainfall recording station)

2001	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1						1.00	0.80					
2							1.80		1.50			
3		0.10	0.30						0.20			
4		0.20					0.30		1.50			
5								0.90				
6										0.20		
7						0.50			0.30			
8	0.30											
9						1.40			0.20			
10												2.50
11		0.50							0.10			
12	0.50	0.40	0.70				1.80					0.05
13		0.10		0.10		0.40		1.60				0.20
14			0.20			0.30		0.20	0.10	0.40		
15			1.30									
16												
17												
18								0.80				
19								0.60				
20			2.10			0.90	3.10	1.20		0.30		
21		0.60				0.10						
22	0.20				0.70		0.30					
23							0.60				0.60	
24									0.30		0.50	
25			0.20	0.40								
26					0.50		0.20					
27		0.10					5.00					
28			0.30		1.30		0.70					
29			0.30		0.30		0.30					
30	0.10						0.10					
31												

(Monthly Figures)

Year's Rainfall Total:

45.65

SUM	1.10	2.00	5.40	0.50	2.80	4.60	15.00	5.30	4.20	0.90	1.10	2.75
MAX	0.50	0.60	2.10	0.40	1.30	1.40	5.00	1.60	1.50	0.40	0.60	2.50
MIN	0.10	0.10	0.20	0.10	0.30	0.10	0.10	0.20	0.10	0.20	0.50	0.05
AVG	0.28	0.29	0.68	0.25	0.70	0.66	1.25	0.88	0.53	0.30	0.55	0.92

No entries indicate no rainfall.

(Rainfall Data covers Areas 8, 9A and 9B.)

ANNUAL TABLE OF DAILY RAINFALL DATA
SOURCE: Mt. Pleasant Waterworks and Sewer Commission
Mt. Pleasant, SC (Rifle Range Road rainfall recording station)

2002	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1				0.90	0.10			0.10	0.50			
2			0.10					0.10				
3	0.20		2.50						0.50			
4			0.10		0.40							
5					0.20		0.20				0.30	
6	0.20						0.30	0.20	0.10		1.60	0.30
7	0.50	1.60					1.00	0.20			0.20	
8		0.40				0.10				1.00		
9			0.20				0.30			3.50		
10		0.50		0.20						0.30		1.00
11		0.30		2.10						1.20	1.50	0.30
12				0.10						0.90	0.90	
13	1.00		0.50				0.50				1.70	1.00
14					0.70					0.70		
15	0.50					0.30	1.30	0.10		1.30		
16		0.10							0.60	0.30		
17											1.00	
18								0.20			0.20	
19					1.00	3.50						0.20
20					0.20	0.10						0.70
21		0.50				2.00						
22			0.70			1.30	0.10	0.20		0.30		
23		0.10				4.50	3.50					
24							0.10					
25								0.40	0.10	0.10		1.80
26	0.20							0.30	4.80			
27			0.30					1.00	0.40			
28				0.10				1.50				
29								0.90		0.40		
30								3.80		0.20		
31			0.90					1.50				

(Monthly Figures)

Year's Rainfall Total:

76.90

SUM	2.60	3.50	5.30	3.40	2.60	11.80	7.30	10.50	7.00	10.20	7.40	5.30
MAX	1.00	1.60	2.50	2.10	1.00	4.50	3.50	3.80	4.80	3.50	1.70	1.80
MIN	0.20	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.20	0.20
AVG	0.43	0.50	0.66	0.68	0.43	1.69	0.81	0.75	1.00	0.85	0.93	0.76

No entries indicate no rainfall.

(Rainfall Data covers Areas 8, 9A and 9B.)

Shellfish Management Area 09A

Conditional Areas Management Plan

(Includes)

Evaluation of Management Plan

Pollution Event Closure

Special Data Set

Shellfish Management Area 09A
CONDITIONAL AREA MANAGEMENT PLAN
April 24, 2003

I. AREA DESCRIPTION

The 2003 Annual Update indicates that the Area 9A Conditionally Approved area requires modification. A data summary of the Conditionally Approved area stations for calendar year 2002 is included in the Conditional Area Evaluation of the Management Plan. The summary shows the geometric mean and 90th percentile values for the Conditionally Approved stations (including boundary stations) and their new classifications.

The following is a description of Area 09A Conditionally Approved areas as indicated in the 2003 Annual Update:

Conditionally Approved:

1. Those waters of Swinton Creek and adjacent marshlands landward of Station 3;
2. Those waters of Inlet Creek and adjacent marshland from Station 27 landward to Station 32;
1. Those waters along the southern shore of Inlet Creek from Station 32 to Station 6;
4. Those waters of the right fork of Inlet Creek and adjacent marshland landward from Station 6 to its headwaters;
5. Those waters of Conch Creek and adjacent marshlands landward of Station 17;
6. Those waters of Hamlin Creek and adjacent marshlands from Station 26 to Grey Bay at Station 2;

A map indicating the Area 09A Conditionally Approved area boundaries is included in the 2003 Annual Report.

II. FACTORS INDICATING SUITABILITY OF PORTIONS OF AREA 09A AS CONDITIONALLY APPROVED

A. The major pollution source adversely affecting water quality in Area 09A is nonpoint source in origin.

B. Area 09A sustains water quality impacts from rainfall events that are predictable based upon real-time availability of precipitation data.

C. Area 09A has a tidal range sufficient to allow substantial exchange with coastal ocean waters. This exchange results in a typical salinity range of 24 to 32 ppt. Depressed salinities due to rainfall are temporary.

III. PREDICTABLE POLLUTION EVENTS

A. Wastewater Treatment Facilities

1. There are no NPDES Facilities discharging into Area 9A Conditionally Approved waters.

B. Meteorological Events

1. Closures of Conditionally Approved waters within Area 09A shall be based on the following criteria:
 - a. Rainfall greater than or equal to 1.2 inches within a 24 hour period;
 - b. Rainfall greater than or equal to 1.7 inches within a 72 hour period.

Historical data indicates that rainfall totals addressed in Section (a) and (b) above, consistently impact water quality in the AConditional Area.@

Rainfall data used to manage the conditional portions of Area 09A is measured and recorded at the Mt. Pleasant Waterworks (Waterworks) Rifle Range Road location. Rainfall amounts are recorded each day at approximately 8:00 a.m. for the prior 24-hour period.

2. Rainfall data beginning in January 1995 is available at the Waterworks location and data starting in 1990 is available from the Center Street location. The Rifle Range Road site is located directly adjacent to the conditional portions of Area 09A. The historical analysis will be based upon this data.
 - a. In 2000, there were 10 rainfall events, which based upon the criteria outlined in Section III.B(1) closed the AConditionally Approved@portion of Area 09A.
 - b. In 2001, there were 10 rainfall events which violated the criteria.
 - c. In 2002, there were 15 rainfall events which violated the criteria.

The data noted above indicates that precipitation exceeding the management criteria, and thus requiring closure of conditional waters occurred an average of 11.7 times per year over the three year evaluation period.

C. Seasonal Events

1. No marinas will be conditionally managed.
2. Rainfall totals are fairly consistent throughout the year. Rainfall events vary in intensity and duration, with winter precipitation being generally uniform in nature while spring, summer and fall rainfall patterns are typically more dynamic, with thunderstorms being

quite common.

3. Migratory waterfowl populations appear to impact portions of the conditionally approved area during the summer months. Analytical results reveal elevated fecal coliform concentrations during the months of June, July and August in areas where large numbers of birds have been noted.
4. The occupancy of Goat Island increases during the summer months. Goat Island is served solely by individual septic systems.

IV. IMPLEMENTATION OF A CONDITIONAL AREA CLOSURE

A. Responsibility/Determination

1. The Trident EQC District Shellfish Program Manager (Manager) is the responsible party for insuring compliance with all aspects of this plan, including the tracking of rainfall criteria violations. In the event that the manager shall be unavailable, an employee shall be designated to have the responsibility for tracking, compliance and notification procedures.
2. The South Carolina Department of Health and Environmental Control (SCDHEC), Trident District Shellfish staff shall track and verify rainfall amounts received in the conditional area.
3. Determination of criteria violation will be determined within 16 hours of each rainfall event.

B. Implementation of Closure (September through May)

SCDHEC is the state agency with the authority to close any shellfish harvesting area that presents a potential public health hazard. The following procedures shall be used by the agency in the event a closure is necessary:

1. The SCDHEC Trident District Shellfish staff shall verify rainfall amounts in excess of 1.2 inches within a 24 hour period or 1.7 inches within a 72 hour period. The area shall be closed immediately with documentation being made to the area file. Origination of press releases will follow the criteria outlined in Section IV.(B)2. The State Shellfish Program Manager (or his designee) shall be contacted immediately regarding any pending closure.
2. SCDHEC's Office of Media Relations (Media Relations) is the responsible authority for issuance of news releases. Media Relations, when possible, shall be notified within two hours of the determination of the need for a closure. They shall be provided with

specific information regarding the pollution event and affected area. In the event of the need for a weekend or holiday closure, Trident District Shellfish staff will contact Media Relations through their on-call pager number or through the Department's emergency response telephone number. If determination of a violation occurs during working hours (8:30-5:00), a press release will normally be issued within four hours. If a determination of a violation occurs after normal working hours, a press release will be issued by noon the following day. News release shall be coordinated through the State Shellfish Program Manager.

3. A SCDHEC representative shall contact the appropriate representative of the South Carolina Department of Natural Resources (DNR) of the closure by telephone or fax. Initial notification to DNR will be to the Office of Fisheries Management (Permit Coordinator) and DNR Law Enforcement Offices at Fort Johnson.
4. Certified Shippers with interests in the affected area shall be notified in person or by telephone by Trident District Shellfish staff. Upon notification to DNR, the permit coordinator will notify the lease holders and harvesters in the affected area.
5. SCDHEC has posted an adequate number of conditional area signs throughout the area. Additionally, a map indicating the current condition of the affected area will be posted at the Breach Inlet Boat Landing, as well as any other location where SCDHEC and SCDNR may choose to erect a public information display. Map postings shall take place immediately following issuance of the draft news release.
6. A Trident EQC District Law Enforcement Officer (LEO) shall insure that adequate patrols of the area are conducted during the closure. Documentation of these patrols shall be maintained. Unless a Trident District LEO has personal knowledge that a violator has been notified of the closure, under no circumstance shall a summons be issued during the first 48 hours following the initial call to Media Relations. Written warnings shall be issued during this 48 hour period and all shellfish should be returned to the water.
7. SCDHEC is the designated agency for patrolling waters closed for public health reasons.

C. Management of Conditional Areas Extraneous to the Normal Shellfish Harvest Season (June through August)

Mariculture and aquaculture permittees shall be notified by Trident District Shellfish Program staff of any closures and subsequent reopenings in the conditional area within the time frame specified above. Additionally, SCDNR shall be notified per item B.3 above. All notifications shall be documented in the area closure file.

D. Enforcement of Closures

1. SCDHEC is the agency responsible for public health protection. This includes public notice and closures of shellfish management areas.
2. Area 09A will be patrolled daily during the first 72 hours of the closure to promote awareness that the Conditionally Approved area has been closed. The frequency of continued patrols will be at the discretion of the Trident District Shellfish staff. SCDHEC patrol officers may coordinate with other law enforcement officers to insure adequate area coverage. Additional aspects of closure enforcement should comply with Section B.6 above.

V. CONTROL ELEMENTS USED TO REOPEN AFTER A POLLUTION EVENT

Opening of areas following closure due to violation of management plan criteria shall adhere to the following control elements:

- A. The area shall remain closed for a minimum period of 14 consecutive days following the end of a rainfall event. If, during the initial closure period, a subsequent event occurs that meets the criteria for a closure, the area shall remain closed for 14 consecutive days following the occurrence of the subsequent event.
- B. The bacteriological water quality at all stations located within, or on the boundary of, the closed Conditionally Approved area shall be assessed prior to reopening. The following stations shall be sampled for reopening: 2, 3, 6, 17, 23, 25, 26, 27, 32 and 35. The area shall remain closed and be re-sampled at a later date if greater than 15% of the samples (ie. 2 or more stations) exceed a fecal coliform MPN of 43.
- C. Trident District Shellfish staff and the State Shellfish Program Manager (or his designee) shall concur on the decision to reopen the area.
- D. Trident District Shellfish staff shall notify SCDNR, Division of Commercial Fisheries Management and law enforcement, immediately upon a decision to reopen the area.
- E. Press releases should be developed and issued following procedures outlined in Section IV.(B)2.
- F. Local Certified Shippers shall be notified by SCDHEC of the opening as soon as possible.
- G. The Area 09A Conditional Area map at Breach Inlet should display the area in the open status.

VI. Management Plan Evaluation

This plan shall be evaluated once per year as a part of the Shellfish Management Area 09A Annual Update.

Shellfish Management Area 09A
MANAGEMENT PLAN EVALUATION
April 24, 2003

EVALUATION

Shellfish Management Area 09A, including all Conditionally Approved portions, is evaluated annually for the most recent three year period. The current evaluation period is January 1, 2002 through December 31, 2002. Bacteriological water quality samples used for classification purposes were collected monthly from each station within Area 09A. Additionally, special sampling was conducted in order to be used for Conditional Area openings unless pre-scheduled sampling (systematic random sampling) followed the pollution events and thus could be used for opening determination. Data used for opening follow this evaluation.

- 1) Compliance - Conditionally Approved areas were closed well within specified time-lines. Mount Pleasant reads its rain gauge at 8:00am each morning and records the rainfall for the day prior.
- 2) All occurrences of rainfall ≥ 1.2 inches in 24 hours or ≥ 1.7 inches in 72 hours were followed by a Conditional Area closure.
- 3) Notifications of rainfall criteria violations were always prompt.
- 4) For the Annual Update review period (January 1, 2000 through December 31, 2002) 19 samples were collected while the Conditionally Approved area was in the Open status. Analysis of 2002 calendar year data collected when the Conditionally Approved area was in the open status indicates that stations 01, 11, 17A, 19, 20, 24, 29 and 31 did not meet the statistical criteria for an Approved classification (Special Data Set for Conditional Management Area - Collected while in Open Status).
- 5) The primary pollution source in Area 09A is non-point source pollution which enters the estuary via several drainage ditches. These have been well documented over the last 10 years.
- 6) At a minimum, samples have been collected monthly during the evaluation period.
- 7) No marinas were conditionally managed. All marinas are circumscribed by a minimum 1000 foot Administrative Closure.

RECOMMENDATIONS

Overall management of Area 09A, based upon the present management plan, has been successful. No major changes to the procedures of the plan are recommended. The plan has been amended to reflect a reduction in Conditionally Approved acreage based upon the failure of eight stations to comply with management plan criteria.

Shellfish Management Area 9A 2002 Pollution Event Closures

Criteria - Greater than or equal to 1.2"/24 hrs and/or greater than or equal to 1.7"/72hrs

Violation Date	Event	Mariculturists Notified	Press Release	Sample Date	Reopening Date
02-07-02	Closed area-Rainfall violation	02-07-02	02-07-02		
	Opened area	02-21-02	02-21-02	02-13-02 R	02-21-02
03-03-02	Closed area-Rainfall violation	03-03-02	03-03-02		
	Opened Area	03-16-02	03-16-02	03-11-03 R	03-16-02
04-11-02	Closed Area-Rainfall violation	04-11-02	04-11-02		
	Opened Area	04-26-02	04-26-02	04-23-02	04-26-02
07-19-02	Rainfall violation- Harvest season closed				
07-22-02	Rainfall violation- Harvest season closed				
07-23-02	Rainfall violation- Harvest season closed				
08-23-02	Rainfall violation- Harvest season closed				
09-26-02	Closed Area-Rainfall violation	09-26-02	09-26-02		
10-03-02	Closure Extended-Samples were bad			10-01-02 S	
10-09-02	Closure Extended-Rainfall violation				
10-11-02	Closure Extended-Rainfall violation				
10-15-02	Closure Extended-Rainfall violation				
11-06-02	Closure Extended-Rainfall violation				
11-11-02	Closure Extended-Rainfall violation				
11-13-02	Closure Extended-Rainfall violation				
	Opened Area	12-05-02	12-05-02	12-03-02 R	12-05-02
12-25-02	Closed Area-Rainfall violation	12-25-02	12-25-02		
	Opened Area	01-10-03	01-10-03	01-08-03 S	01-10-03

R= Routine sampling

S= Special Sampling

South Carolina does not allow harvesting during the summer months. There are currently no mariculture operations within the conditional portion of Area 09A. Therefore, there is no need for press releases during the closed season.

SPECIAL DATA SET

FECAL COLIFORM BACTERIOLOGICAL DATA SUMMARY

From Conditional Management Area Stations

Collected while in Open Status

Between January 1, 2002 and December 31, 2002

Station # ^o	1	2	3	6	11	12	17	17A	19	20
SAMPLES	4	4	4	4	4	4	4	4	4	4
GEOMEAN	4	3.3	6.9	4	9.6	3.8	7.1	10.3	8.6	9.8
90TH %ILE	143	7	30	27	104	11	21	133	32	119
WATER QLTY	R	A	A	A	R	A	A	R	A	R
CLASSIFICATION	R	CA	CA	CA	R	A	CA	R	R	R

Station # ^o	23	24	25	26	27	29	31	32	35	37
SAMPLES	4	4	4	4	4	4	4	4	4	4
GEOMEAN	6.4	13.1	4.5	12	4.9	21	20.5	6.1	6.6	3.8
90TH %ILE	23	40	9	124	21	200	260	44	10	11
WATER QLTY	A	R	A	A	A	R	R	A	A	A
CLASSIFICATION	CA	R	CA	CA	CA	R	R	CA	CA	R

A - Approved **CA** - Conditionally Approved **R** - Restricted
RND - Restricted/No Depuration **P** - Prohibited